

wherein  $R^1$ ,  $R^4$  and  $R^6$  represent a hydrogen atom or a methyl group,  $R^2$ ,  $R^5$  and  $R^7$  represent a bridged hydrocarbon group having the carbon number from 7 to 22,  $R^3$  represents a hydrogen atom, a methyl group or an acetyl group,  $R^8$  represents a group decomposed by acid, m equals 0 or 1, n equals 0 or 1, i equals 0 or 1, k equals zero or 1,  $x + y + z = 1$ , x ranges from 0.05 to 0.75, y ranges from zero to 0.8 and z ranges from zero to 0.6.

### REMARKS

The examiner rejects claims 1,3,5 and 6 under 35 USC 102(c) as being anticipated by Choi et al. The applicant cancels claim 1, and rewrites claim 3 in independent form. Claim 6 is dependent on claim 3. Applicant believes independent claim 3 is distinguishable and advantageous over Choi.

Firstly, Choi's photosensitive polymer contains the component suffixed with m (which is hereinbelow referred to as "m component") and the component suffixed with n (which is referred to as "n component"). The m component may be corresponding to the monomer suffixed with x in claim 3. However, the n component and the copolymer between m component and the n component are different from the other monomers and the copolymer in claim 3.

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In detail, the n component of Choi does not have any alicyclic group. On the other hand, all of the monomers of the polymer defined in claim 3 contain the alicyclic group (see R<sup>2</sup>, R<sup>5</sup>, R<sup>7</sup>). As described in the specification, the alicyclic group is indispensable component which improves the dry etching resistance.

Moreover, the polymer defined in claim 3 is the combination of the monomers respectively suffixed with x, y and z. The monomer suffixed with x has the alicyclic group bonded with hydroxyl group, methoxy group or acetyl group, and the monomers suffixed with y and z have the alicyclic group bonded with an acid decomposed group where carboxyl group is expressed by R<sup>8</sup>. Choi's polymer has the m component, which has the alicyclic group bonded with hydroxy group, and the n (meth)acryl component protected by an acid decomposed group R<sup>3</sup>. Therefore, the alicyclic-carboxyl group is never contained in Choi's polymer.

The above-described difference results in the following effects. In claim 3, the ratio "x" is defined to range from 5 percent to 75 percent. Figure 1 of the attached drawings shows the relation between the dissolving velocity and the ratio "x", and teaches that the copolymer is never dissolved in alkaline developing solution if the ratio "x" exceeds 75 percent. In other words, it is impossible to use the copolymer in a resist. Choi, however, is silent to the limit of the ratio "x" as exactly pointed out by the Examiner. The variation of the dissolving velocity is quite sharp, and is unique. This characteristic was achieved by the combination between the alicyclic-carboxyl group (the "y" component and the "z" component) and the alicyclic-hydroxyl group (the "x" component). Using the polymer with the sharp variation, a high-resolution pattern transfer becomes possible. This relation was firstly found by the present inventors. Thus, the copolymer containing the components suffixed with "x", "y" and "z" is appropriate to a high resolution resist, and is not only distinguishable from but also advantageous over Choi's polymer.

As to the adhesive power, the monomer defined in claim 3 enhances the adhesive power of the copolymer. As described hereinbefore, although the carboxyl monomer or the "y" compound is indispensable for the resist, the "x" component improves the adhesive power, and the combination is not obvious from Choi's polymer. Although the "z" component is protected by using  $R^8$ , the carboxyl monomer serving as the component "y" is not protected. This is because of the fact that affinity is required for non-dissolved portion of the resist. If the non-dissolved portion is perfectly against an alkaline developer, a fine pattern is hardly achieved. From this aspect, the copolymer defined in claim 3 is superior to Choi's polymer,

Although only an argument was presented regarding the polymer where the "x" component has the hydroxyl group, i.e.,  $R^3$  is hydrogen, a large adhesive power was achieved by the "x" component where  $R^3$  is methyl or acetyl group. Therefore, the applicants believe that the present invention defined in claim 3 is patentable over the teachings of Choi.

### **CLOSING**

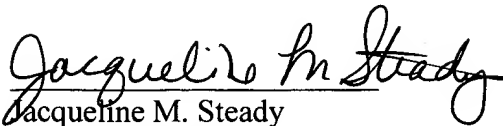
An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that independent claim 3 is in condition for allowance as well as those claims dependent therefrom. Passage of this case to allowance is earnestly solicited.

However, if for any reason the Examiner should consider this application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

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Respectfully submitted,

  
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